



UNIVERSITI PUTRA MALAYSIA

**EFFICACY AND COSTS OF TWO TREATMENTS
FOR DIARRHOEA IN CALVES**

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FOR DIARRHOEA IN CALVES**

By

SITI NOR BINTI CHE YAHYA

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,
in Fulfillment of the Requirement for the Degree of Master of Veterinary Science**

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DEDICATION

WITH APPRECIATION AND RESPECTS,

THIS THESIS IS DEDICATED

TO

**MY PARENTS AND MY FAMILY: BABA, FARHAN, FADZLEEN,
FAWWAZ AND FAYYADH, ALSO MY BROTHER ABDUL RAHMAN**

WHO INSPIRED ME

AND

MAKE IT WORTHWHILE

Abstract of thesis presented to the Senate of University Putra Malaysia in fulfillment of the requirement for the degree of Master of Veterinary Science

EFFICACY AND COSTS OF TWO TREATMENTS FOR DIARRHOEA IN CALVES

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February 2003

Chairman :Associate Professor Dr. C.T.N. Fatimah Iskandar

Faculty :Veterinary Medicine

Fifty seven (57) dairy calves from small dairy holders in Serdang, Bangi and Puchong, Selangor, aged from one to 12 weeks were monitored weekly for their health status and episode of diarrhoea. The clinical parameters of each calf were also recorded until the end of the study. The blood was sampled at one-week-old for IgG, total protein, albumin and globulin levels. The calves were grouped according to their management practices.

All diarrhoeic calves were dewormed with Ivomectin® (1ml/50kg BW, SQ) and Sulphadimidine® (0.5ml/kg BW, SQ) as coccidiostat. The

diarrhoeic calves were then chosen to be treated orally with Oral Electrolyte Salt (5gm/1L water) *at lib.* (TxA) or Herbal Product (15gm/40ml water) BID (TxB). Treatment was given for 3 days. The efficacy of the treatments was measured quantitatively based on the recovery rate and body weight of the calves at the end of the study. The cost of the treatments was calculated based on the cost of the drugs used which referred to the selling cost at Universiti Veterinary Hospital (UVH), Universiti Putra Malaysia (UPM). The cost of the disease incidence was calculated based on the cost of drugs, labour, veterinary services, dead calf and weight loss.

From the study it was noted that the efficacy of the treatment was highly related to the management of the calves. Calves from the least contaminated management (MG2) showed higher recovery rate. Another factor that interfered with the treatment was nursing of the diarrhoeic calves. This was shown from worst contaminated farm (MG1) which had a better recovery rate as compared to the MG3 farm (less contamination). TxA was more effective than TxB. The cost of the treatment TxA was significantly less than treatment TxB. The cost of the disease incidence was related to the cost of the drugs used, cost of weight loss and cost of the dead calves. The IgG levels of the calves (mean age at testing was at one week old) were evaluated using Bovine IgG ELISA Quantitation Kit. Comparison was made between the management groups. It was highest

from MG2 (2.95g/l) and lowest from MG3. The globulin level of MG2 (63.61g/l) was above the normal range (27-45g/l) which indicates for higher immunoglobulin.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
sebagai memenuhi keperluan Ijazah Master Sains Veterinar

**KEBERKESANAN DAN KOS DUA RAWATAN
BAGI PENYAKIT CIRIT BIRIT PADA ANAK LEMBU**

Oleh

SITI NOR BTE CHE YAHYA

February 2003

Pengerusi :Profesor Madya Dr. C.T.N. Fatimah Iskandar

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Sejumlah lima puluh tujuh (57) ekor anak lembu tenusu daripada pentemak kecil sekitar Serdang, Bangi dan Puchong, Selangor, yang berumur dari satu hingga 12 minggu telah di pantau setiap minggu dari segi tahap kesihatan dan tanda klinikal cirit birit. Data klinikal setiap anak lembu direkodkan sehingga tamat tempoh kajian. Sampel darah juga diambil pada minggu pertama untuk mengkaji tahap IgG, total protein, albumin dan globulin. Anak-anak lembu tersebut di bahagikan kepada 3 kumpulan mengikut jenis pengendalian.

Setiap anak lembu yang menunjukkan tanda klinikal cirit birit telah di nyahcacing menggunakan Ivomectin® (1ml/50kg BW, SQ) dan Sulphadimidine® (0.5ml/kg BW, SQ) sebagai anti coccidia. Salah satu rawatan cirit birit diberikan kepada anak lembu, samaada menggunakan *Oral Electrolyte Salt* (5gm/1L air) *at lib.* (TxA), atau menggunakan campuran herba (15gm/40ml air) *BID* (TxB). Tempoh rawatan adalah selama 3 hari.

Keberkesanan rawatan adalah diukur secara quantitativ mengikut peratusan kesembuhan dan berat badan anak lembu pada akhir kajian. Kos setiap rawatan dinilai mengikut kos ubat yang digunakan. Kos ubat yang digunakan adalah dirujuk kepada kos jualan di Hospital Veterinar Universiti (UVH), Fakulti Perubatan Veterinar (FPV), Universiti Putra Malaysia (UPM).

Daripada kajian ini didapati keberkesanan rawatan adalah sangat berkait rapat dengan jenis pengendalian anak-anak lembu yang baru lahir atau yang sakit. Anak-anak lembu dari kumpulan terkecil peratusan kontaminasi (MG2) telah menunjukkan peratusan kesembuhan tertinggi. Faktor lain yang juga mempengaruhi keberkesanan rawatan adalah sikap pentemak dalam mengendalikan anak lembu yang sakit. Kesannya dilihat pada kumpulan anak lembu dari kumpulan tertinggi peratusan kontaminasi (MG1) yang mempunyai peratusan kesembuhan yang lebih tinggi jika

dibandingkan dengan kumpulan anak lembu dari kumpulan pertengahan peratusan kontaminasi. Keberkesanan rawatan adalah lebih baik oleh TxA. Kos TxA adalah lebih rendah daripada TxB. Kos penyakit adalah berkait rapat dengan kos ubat yang digunakan, kos kejatuhan berat badan dan kos anak lembu yang mati kerana cirit-birit. Tahap IgG (anak lembu berumur satu minggu) telah di ukur menggunakan Bovine IgG ELISA Quantitation Kit. Perbandingan telah dibuat diantara jenis pengendalian anak lembu. Kumpulan MG2 menunjukkan tahap IgG tertinggi (2.95g/l), sementara tahap terendah adalah dari kumpulan MG3. Tahap globulin melebihi julat normal (27-45g/l) ialah dari kumpulan MG2 yang menunjukkan tahap immunoglobulin tinggi.

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I certify that the Examination Committee met on 25th February 2003 to conduct the final examination of Siti Nor Binti Che Yahya on her Master of Veterinary Science thesis entitled "Efficacy And Costs Of Two Treatments For Diarrhoea In Calves" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

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DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations, which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.


SITI NOR BINTI CHE YAHYA

DATE: 10.06.03

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LIST OF ABBREVIATIONS

%	Percent
E.coli	<i>Escherichia coli</i>
E.bovis	<i>Escherichia bovis</i>
ETEC	Enterotoxigenic <i>Escherichia coli</i>
UK	United Kingdom
ICF	Intracellular fluid
ECF	Extracellular fluid
Na	Sodium
K	Potassium
PCV	Packed cells volume
mmol/L	Mili mol per litre
<	Less than
HCO ₃	Bicarbonate
BD	Base deficit
BW	Body weight
IgG	Immunoglobulin G
USDA	United States Department of Agriculture
\$	Dollar
Ig	Immunoglobulin

g/L	Gram per litre
L	Litre
g	Gram
US	United States
ml	Mili litre
BID	Twice a day
TPR	Body Temperature, heart /pulse rate, respiratory rate
ORT	Oral rehydration therapy
IVT	Intravenous therapy
WHO	World health organization
OES	Oral electrolyte solution

CHAPTER 1

INTRODUCTION

Neonatal calf diarrhoea is a complex disease, which is caused by a number of infectious agents (Morin *et al.*, 1976). It has been difficult to determine the role of many different pathogens, including bacteria, viruses and parasites, which have been isolated from affected calves. The infectious agents most commonly incriminated are *Escherichia coli*, coronavirus, rotavirus and cryptosporidia. Aetiological diagnosis on clinical ground of infectious diarrhoeic diseases in calves is often difficult, because a variety of agents may be involved within the same herd and clinical signs and gross lesions produced by the different agents are often non-specific. Non-infectious determinants that may promote the disease include the range of nutritional, immunological and environmental factors (Krogh *et al.*, 1985).

Coccidiosis in calves-the result of *Eimeria zumii* or *E. bovis* infection is occasionally encountered in post-weaning, shortly after group housing and may be confused with salmonellosis because of the presence of digested or fresh blood and mucus in the faeces of the acute cases with obnoxious odour. In these cases tenesmus is not uncommon and may lead

to rectal prolapse. Unthriftiness may be obvious in those animals not showing the acute signs, sometimes in association with mild diarrhoea (Smith, 1995).

The amount of colostrum fed and age at first feeding are the two major factors in determining maximum immunoglobulin concentration in serum (Stott *et al.*, 1979). Calves receiving inadequate amount of colostrum are predisposed to other diseases (McEwan *et al.*, 1970).

The main effects of diarrhoea are dehydration, metabolic acidosis, pre-renal uraemia and hyponatraemia. Hypernatraemia is unusual and mild. Calves which survive tend to be hypokalaemic whereas those, which die, show intensifying metabolic acidosis and hyperkalaemia. Hypoglycaemia develops, but it is not generally worse in calves that fail to survive, though there are exceptions (Groutides and Michell, 1990b).

The most frequent therapy for calf diarrhoea is fluid therapy, which is important for rehydration and volume replacement. In addition to that, it is better to add electrolytes, particularly bicarbonate (Booth and Naylor, 1987; Roussel, 1990). The incidence of calf diarrhoea in the United States has not been significantly reduced by the use of oral antibiotics and diarrhoea remains the leading cause of death among neonatal calves. Adding

neomycin to the feed of calves results in an increase in incidence of early diarrhoea from 8% to 20%, but has no effect on incidence of late diarrhoea. Early diarrhoea recurs more frequently among calves fed neomycin and treated orally with antibacterial agents (Shull *et al.*, 1978).

Disease in food-producing animals is an important factor that affects the management practice and the economic success of livestock operations. Acute undifferentiated diarrhoea of calves from a few days up to 30 days of age accounts for a major portion (78%) of the economic loss (Radostit *et al.*, 2000). The cost associated with disease incidence is allocated to the following categories (Hird *et al.*, 1991):

1. Veterinary services for treating diseased animals, which include the cost of the services and drugs administered.
2. Produces labour for treating diseased animals that is, the number of hours that the herd owner and his employees spent in treating diseased animals by the monetary value of an hour of labour on that farm.
3. Death of diseased animals, defined as the market value of a similar animal sold in a healthy condition.
4. The decrease value of culled animals.